I claim:

1	1	A method	comprising	the	stens	of
ı	١.	Ameliou	COMPRISING	แเษ	SIGNS	UI.

- forming a multilayered structure having at least a top layer, a middle layer and a
- 3 bottom layer adjacent to each other, where said middle layer has a thickness, d;
- 4 defining at least a first hole in said top layer and through said middle layer;
- 5 defining at least a second hole in said bottom layer and through said middle
- 6 layer, said first and second holes being offset from one another; and
- 7 defining a channel between said first and second holes in said middle layer so
- 8 that only objects having a size of d or smaller may traverse said multilayered structure
- 9 through said first and second holes and said channel.
- 1 2. The method of claim 1 where the step of forming a multilayered structure forms a
- 2 top and bottom layer composed of material different from that composing said middle
- 3 layer so that a selective etchant of said middle layer is used to define said channel.
- 1 3. The method of claim 1 where the step of forming a multilayered structure forms a
- 2 middle layer with a thickness, d, in the range of 1 5nm.
- 1 4. The method of claim 1 where the step of defining at least a first hole in said top
- 2 layer and defining at least a second hole in said bottom layer defines a plurality of offset
- 3 holes in said top and bottom layer.

- 5. The method of claim 1 further comprising the steps of disposing a conductive
- 2 layer on said top and bottom layers and applying a signal to said conductive layer on
- 3 said top and bottom layers to trap charged organic molecules traversing said structure,
- 4 to vary filtration realized through said channel by means of channel restriction, or to
- 5 provide valving.
- 1 6. The method of claim 5 where said signal is a radiofrequency signal characterized
- 2 by at least one frequency and further comprising varying said at least one frequency of
- 3 said signal to selectively match specific organic molecules traversing said structure.
- 1 7. The method of claim 5 where said signal is a DC signal characterized by a
- 2 magnitude and further comprising varying said magnitude to correspondingly vary the
- 3 size of said channel and filtration provided thereby.
- 1 8. The method of claim 5 where said signal is a DC signal characterized by a
- 2 magnitude and further comprising varying said magnitude to open or close said
- 3 channel.
- 1 9. The method of claim 5 where defining at least said first and second hole
- 2 simultaneously defines said first and second hole through said conductive layer on said
- 3 top and bottom layers.

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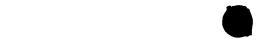
- 1 10. The method of claim 9 where defining at least said first and second hole
- 2 comprises using electron beam lithography to delineate said first and second hole and
- 3 further comprising imaging one of said top and bottom layers while lithographically
- 4 delineating said other one of said top and bottom layers.
- 1 :11. An apparatus comprising:
- a multilayered structure having at least a top layer, a middle layer and a bottom
- 3 layer adjacent to each other, where said middle layer has a thickness, d;
- 4 at least a first hole in said top layer and through said middle layer;
 - at least a second hole in said bottom layer and through said middle layer, said first and second holes being offset from one another; and
 - a channel between said first and second holes in said middle layer so that only objects having a size of d or smaller may traverse said multilayered structure through said first and second holes and said channel.
- 1 12. The apparatus of claim 11 wherein said top and bottom layer are composed of $\sqrt{\mathcal{C}}$
- 2 material different from that composing said middle layer so that a selective etchant of
- 3 said middle layer is used to define said channel.
- 1 13. The apparatus of claim 11 where said multilayered structure forms a middle layer
- 2 with a thickness, d, in the range of 1 5nm.



- 1 14. The apparatus of claim 11 further comprising a plurality of offset holes in said top
- 2 and bottom layer.
- 1 15. The apparatus of claim 11 further comprising a conductive layer on said top and
- 2 bottom layers for the application of a signal to said conductive layer on said top and
- 3 bottom layers to trap charged organic molecules traversing said structure, to vary
- 4 filtration realized through said channel by means of channel restriction, or to provide
- 5 valving through said channel
- 1 16. The apparatus of claim 15 turther comprising a source of a variable
- 2 radiofrequency signal to selectively match specific organic molecules traversing said
- 3 structure.
- 1 17. The apparatus of claim 15 further comprising a source of a variable DC signal to
- 2 vary filtration realized through said channel by means of channel restriction, or to
- 3 provide valving through said channel.
- 1 18. The apparatus of claim 15 where said first and second hole are simultaneously
- 2 defined through said conductive layer on said top and bottom layers.



- 1 19. The apparatus of claim 18 where said first and second hole are delineated using
- 2 electron beam lithography and wherein one of said top and bottom layers can be
- 3 imaged while said other one of said top and bottom layers is lithographically delineated.
- 1 , 20. A nano-scale filter comprising:
- 2 a top layer;
- a middle layer disposed adjacent to said top layer, where said middle layer has a
- 4 thickness, d;
- 5 a bottom layer disposed adjacent to said middle layer;
 - a first plurality of holes defined in said top layer and through said middle layer;
 - a second plurality of holes defined in said bottom layer and through said middle
 - layer, said first and second plurality of holes being offset from one another; and
 - at least one nano-scale channel between said first and second plurality of holes
 - in said middle layer so that only objects having a size of d or smaller may traverse said
 - filter through said first and second plurality of holes and said channel.
- 1 21. The filter of claim 20 further comprising a corresponding plurality of nano-scale
- 2 channels, one of said plurality of nano-scale channels communicating one of said first
- 3 plurality of holes to one of said second plurality of holes.
- 1 22. The apparatus of claim 20 further comprising a first conductive layer disposed on
- 2 said top layer and a second conductive layer on said bottom layer, so that a signal



- 3 applied across said first and second conductive layers serves to selectively filter
- 4 molecules or particles.
- 1 23. The apparatus of claim 20 wherein said channel has a width of d or less.
- 1 24. The apparatus of claim 23 wherein d is in the range of 1 to 5 nm.